EUROPEAN PATENT APPLICATION

(54) **Method, apparatus and assembly of parts for cleaning a pumpsystem for causing air or bathwater to flow out forcefully into a bath.**

(57) In cleaning a pumping system (3, 4, 5, 6) for causing air or bath water to flow out forcefully into a bathtub (1), cleaning agents dissolved in water are circulated through the pumping system (3, 4, 5, 6). According to the invention, during a first cleaning cycle a decalcifier is used as cleaning agent and during a subsequent cleaning cycle a disinfectant is used as cleaning agent. Further, apparatuses and an assembly of means for carrying out the method according to the invention are described.

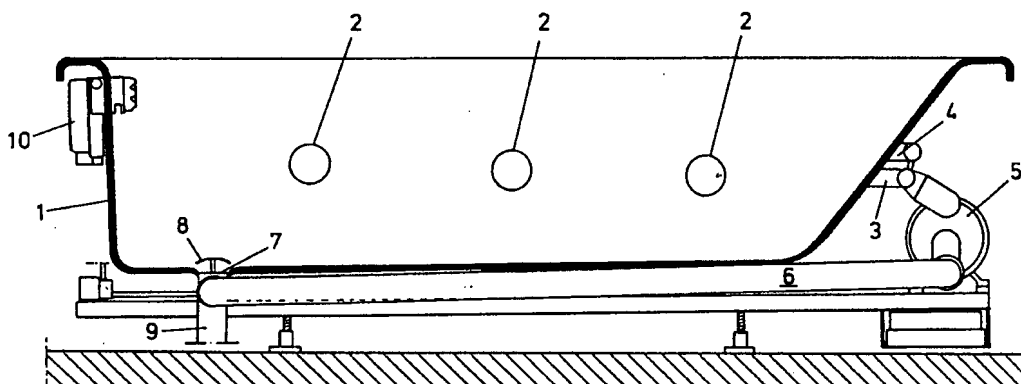The invention enables improved cleaning of the pumping system.

EP 0 519 572 A1

FIG.1

This invention relates to a method as set forth in the preamble of claim 1. Such a method is known from EP-A-0 396 117.

A pump system as mentioned above is used in particular in baths that are generally referred to as "whirlpools". Because dirt will deposit in such a pump system and thereby constitute a breeding ground for bacteria, fungi and algae, it is good practice, for reasons of hygiene, to clean and disinfect such pump systems after each use by circulating water with a cleaning agent dissolved therein through the pump system. This is typically effected by filling the bath after use with a certain amount of this solution and circulating it through the system.

It has been found that especially in regions where the mains water has a high lime content, lime adheres to the piping and soap residues and the like in turn adhere to the lime. Such layers adhering to the lime form a good breeding ground for germs and algae.

In the regions referred to it is problematic to maintain adequate hygienic conditions in baths of the type referred to even if cleaning is done with an increased concentration of cleaning agent and a cleaning agent with decalcifying properties is used. An additional drawback is that these last-mentioned measures entail an increased burdening of the environment.

The object of the invention is to provide a method of the type described in the preamble, which provides for improved cleaning of a pump system while keeping the burden on the environment relatively low.

This object is realized according to the present invention in that in a method as described in the preamble the characteristic features according to claim 1 are employed.

Inasmuch as decalcification and disinfection are effected separately, a decalcifier can be selected without taking into consideration its interaction (such as the formation of salt crystals) with disinfectant and vice versa. Thus, in the first place a particularly effective removal of the lime deposits can be achieved, so that a lesser disinfectant activity will suffice, and subsequently a particularly effective disinfection can be achieved.

As a disinfectant, it is for instance possible to select an agent that does not eliminate amoebas such as are used in sewage treatment plants.

The method according to the invention can be used for a conventional bath of the type described hereinabove, provided the decalcifiers and disinfectants referred to are at hand. Hygiene can be maintained in a particularly reliable manner when an apparatus adapted for the method is used for carrying out the method.

Further, the invention can be embodied in an apparatus according to claim 8, as well as in an assembly of parts according to claim 15. For carrying out the method according to the invention, the apparatus and the assembly each comprise two reservoirs for successively adding decalcifier and disinfectant to the water to be circulated through the pump system.

Hereinafter, the invention will be further illustrated and explained on the basis of one embodiment, with reference to the accompanying drawings, in which:

Fig. 1 is a sectional side elevation of a bath fitted with an apparatus according to the invention, and

Fig. 2 is a diagram of an apparatus according to the present invention.

Fig. 1 shows a bath designed for use of the method according to the invention.

The bath comprises a bathtub 1 provided with outlet openings 2 for causing air or bath water to flow out forcefully under water. Connected to the openings 2 are pipes 3, 4 which are in communication with a pump 5. The pump 5 in turn communicates with a supply pipe 6 connecting to a drain opening 7 in the bottom of the bathtub. The pump 5 and the pipes 3, 4, 6 form the pumping system for circulating bath water or air. Of course, in the case where only air is pumped, the pipe 6 is not used. Air can be drawn in via a supply opening (not shown) upstream of the pump 5.

The drain opening 7 can be shut off by a valve 8 if the bath is to be used without the water flowing through the openings 2. Connecting to the bath is a discharge channel 9 in which is arranged a discharge valve (not shown). By operating this discharge valve, the bath can be drained.

For the method according to the invention to be carried out in a simple manner, the bath is fitted with an apparatus of which a part is schematically shown in Fig. 2. This part is accommodated in the housing indicated by the reference numeral 10 in Fig. 1.

This apparatus comprises two reservoirs represented by the feed arrows 11 and 12 for decalcifier and disinfectant, respectively. These reservoirs 11 and 12 communicate with connecting pipes 13 and 14, respectively, and can be connected selectively with a supply pipe 15 opening into the bath. The apparatus further comprises an element 16 for dosaging liquid supplied from each of the reservoirs 11 and 12, and a water supply pipe 17 comprising dosaging means 18. For the selective connection of the reservoirs 11 and 12 with the supply pipe 15, valves 19 and 20 have been arranged in the supply pipes 13 and 14, respectively. Valves 19 and 20 can be operated by electromagnets 21 and 22, respectively. The dosaging means 18 comprise a valve 23 and an electromagnet 24

for operating valve 23. The supply pipe 15 and the water supply pipe 17 open into a mixing chamber 25. A discharge pipe 26 extends from the mixing chamber to the bathtub 1 (Fig. 1).

In the method according to the invention, during a first cleaning cycle a decalcifier is used as cleaning agent and during a subsequent cleaning cycle a disinfectant is used as cleaning agent. Depending on the hardness of the water, it is possible, for instance, to use decalcifier and disinfectant alternately or to use a disinfectant twice or more often in succession before decalcifier is used again. Preferably, each time the pumping system has been used, a complete cleaning cycle is run.

For decalcifier or disinfectant to be supplied from the reservoirs 11 and 12, respectively, valves 19 and 20, respectively, are opened and the dosaging element 16 is actuated. This dosaging element is designed according to the present embodiment as a pump which draws the liquid from the reservoirs 11, 12 of which the valve 19, 20, respectively, is opened. Depending on the number of strokes or revolutions or the duration of the operation of the pump 16, the dose of the agent in question is determined.

The dosaging element 16 is arranged in the supply pipe 15 and both ends of the supply pipe 15 are connected to the water supply pipe 17. This offers the advantage that by actuating the dosaging element 16 when water is being supplied, clean water flows through the supply pipe 15 so that it will be rinsed clean. Thus, for the dosaging of both disinfectant and decalcifier, a single dosaging element 16 can be used without residues of one agent being supplied along with the other agent.

To provide that the hygiene in the pumping system can be maintained in a reliable manner, it is preferred that the termination of the use of the bath be detected and, in response thereto, at least one complete cleaning cycle be carried out. The detection of the termination of the use of the bath can for instance be detected through the operation of the discharge valve. A cleaning cycle can then be automatically started and carried out after, for instance, 10 minutes.

The dosaging of the amount of cleaning agent is preferably controlled depending on data stored in a data processor. Thus, the dosaging can simply be adjusted, for instance to the hardness of the water, the type of decalcifier or disinfectant that is being used, the type of bath and the type of pumping system.

For the dosaging of the amount of cleaning agent to be controlled depending on data stored in a data processor and for a cleaning cycle to be carried out automatically, the apparatus according to the invention is preferably provided with a data processor with connections for means 19, 20 associated with a particular reservoir 11, 12 for connecting that reservoir 11, 12 to the supply pipe 15, the dosaging element 16, means for operating a discharge valve, means for operating the pump 5 of the pumping system and the dosaging means 18 of the water supply 17.

The data are preferably stored in the data processor from a universal data processor. Thus, the data processor of the apparatus according to the invention can be of simple design.

A particularly quick adaptation of the data in the data processor of the apparatus is possible if the data are inputted to the universal data processor via a telephone line and a modem. It is then possible, for instance, that the user of a bath reports data regarding changed conditions or the use of a different disinfectant or decalcifier to the supplier, which supplier, on the basis of the most recent data, compiles an adapted set of data for the data processor of the apparatus and inputs these data to the universal data processor of the user via the modem. The user in turn inputs the modified set of data to the data processor of the apparatus. The universal data processor can for instance be a data processor of a commonly used PC.

For inputting data to the data processor from a universal data processor, the data processor of the apparatus may be provided with a storage module and a connecting gate for its connection to a universal data processor.

When a cleaning cycle has been completed, the pumping system is preferably substantially drained.

To that end, according to the present invention, the bath with an apparatus according to the invention further comprises a pumping system 3, 4, 5, 6 that is self-draining.

After draining, sufficient disinfectant is left behind to prevent germination. If a suitable disinfectant is used, this will even be the case if the pumping system fills up and drains again, as is the case when a bath is taken without the pumping system being actuated. Draining of the pumping system further prevents the precipitation of dirt contained in water that is present in the pumping system.

Preferably, the apparatus comprises at least a third reservoir (arrow 27). The apparatus according to the present embodiment further comprises a fourth and a fifth reservoir represented by arrows 28 and 29.

This makes it possible to further use the apparatus for dosaged supply of bathing oil, for instance. In particular when medicinal oils are used, accurate dosaging is important. As with the disinfectant and the decalcifier, it is advantageous if dosaging can be effected on the basis of data

stored in a data processor. The design of the apparatus shown in Fig. 2 ensures that no residues of disinfectant or decalcifier are carried along when bathing oil or the like is being supplied from one of the reservoirs 27-29.

The reservoirs are arranged on that side of the wall of the bathtub 1 that faces away from the user, so that they are hidden from view. This is desirable because in particular reservoirs filled with bathing oil can in the course of time acquire an unattractive appearance without this being any indication of the quality of the bathing oil. A further advantage of arranging the reservoirs behind the wall of the tub 1 is that the reservoirs are thus shielded from light, which has a negative influence on the storage life of ethereal oils.

A disinfectant that is particularly suitable for use in the present invention is the disinfectant with German admission number UBA-07700909. A decalcifier which is particularly suitable for use in the present invention is the decalcifier with German admission number UBA-07700059. Depending on the legislation in force, however, it may be necessary to choose other agents.

Claims

1. A method of cleaning a bath comprising a pumping system (3, 4, 5, 6) for causing air or bath water to flow out forcefully into a bathtub (1), in which method water and cleaning agents dissolved therein are circulated through said pumping system (3, 4, 5, 6), characterized in that during a first cleaning cycle a decalcifier is used as cleaning agent and during a subsequent cleaning cycle a disinfectant is used as cleaning agent.

2. A method according to claim 1, characterized in that the relative frequency of the use of decalcifier as cleaning agent depends on the hardness of the water.

3. A method according to claim 1 or 2, characterized in that the termination of the use of the bath is detected and, in response thereto, automatically at least one cleaning cycle is carried out.

4. A method according to claim 3, characterized in that the dosaging of the amount of cleaning agent is controlled depending on data stored in a data processor.

5. A method according to claim 4, characterized in that the data are stored in the data processor from a universal data processor.

6. A method according to claim 4, characterized in that the data are inputted to the universal data processor via a telephone line and a modem.

7. A method according to any one of the preceding claims, characterized in that upon completion of a cleaning cycle the pumping system (3, 4, 5, 6) is substantially drained.

8. An apparatus for carrying out the method according to any one of the preceding claims, comprising at least two reservoirs (11, 12), which can be selectively connected with a supply pipe (15) opening into the bathtub (1), at least one element (16) for dosaging liquid supplied from each of the reservoirs (11, 12) and a water supply pipe (17) comprising dosaging means (18).

9. An apparatus according to claim 8, characterized in that the dosaging element (16) is arranged in the supply pipe (15) and both ends of the supply pipe (15) are connected to the water supply pipe (17).

10. An apparatus according to claim 8 or 9, characterized in that the apparatus comprises at least a third reservoir (arrow 27).

11. An apparatus according to any one of claims 8-10, characterized by a data processor having connections for operating
   the means (19, 20, respectively) each associated with a particular reservoir (11, 12) for connecting that reservoir (11, 12) with the supply pipe (15),
   the dosaging element (16),
   means for operating a discharge valve,
   means for operating the pump (5) and
   the dosaging means (18) of the water supply (17),
   with a program stored in the data processor for operating the means (19, 20, respectively) each associated with a particular reservoir (11, 12) for connecting that reservoir (11, 12) with the supply pipe (15), in such a manner that during a first cleaning cycle a decalcifier is added and during a subsequent cleaning cycle a disinfectant is added.

12. An apparatus according to claim 11, characterized in that the data processor comprises a storage module and a connecting gate for connecting the data processor to a universal data processor, for inputting a program from the universal data processor to the storage module.

13. A bath fitted with a pumping system (3, 4, 5, 6) for causing air or bath water to flow out forcefully into the bath, characterized by an apparatus according to any one of claims 8-12.

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14. A bath according to claim 13, characterized in that the pumping system (3, 4, 5, 6) is self-draining.

15. An assembly of parts for carrying out the method according to any one of claims 1-7, characterized by a container (11) filled with a disinfectant and a container (12) filled with a decalcifier.
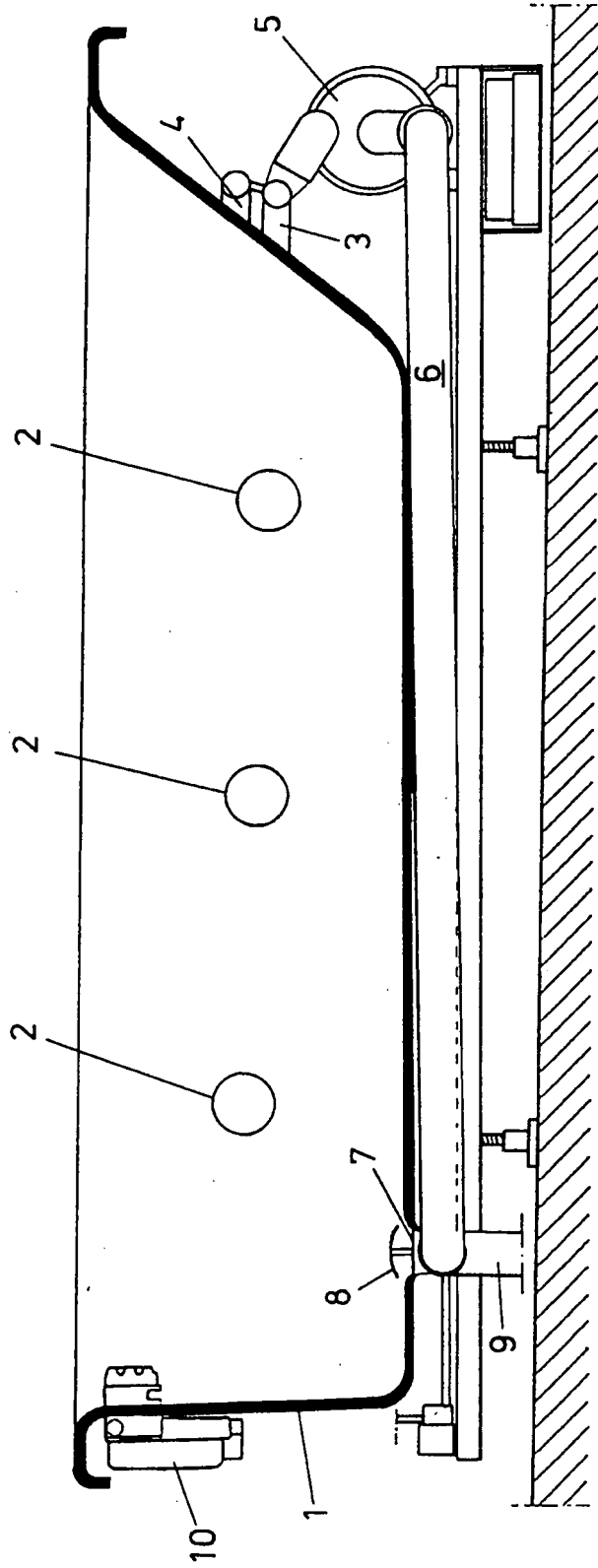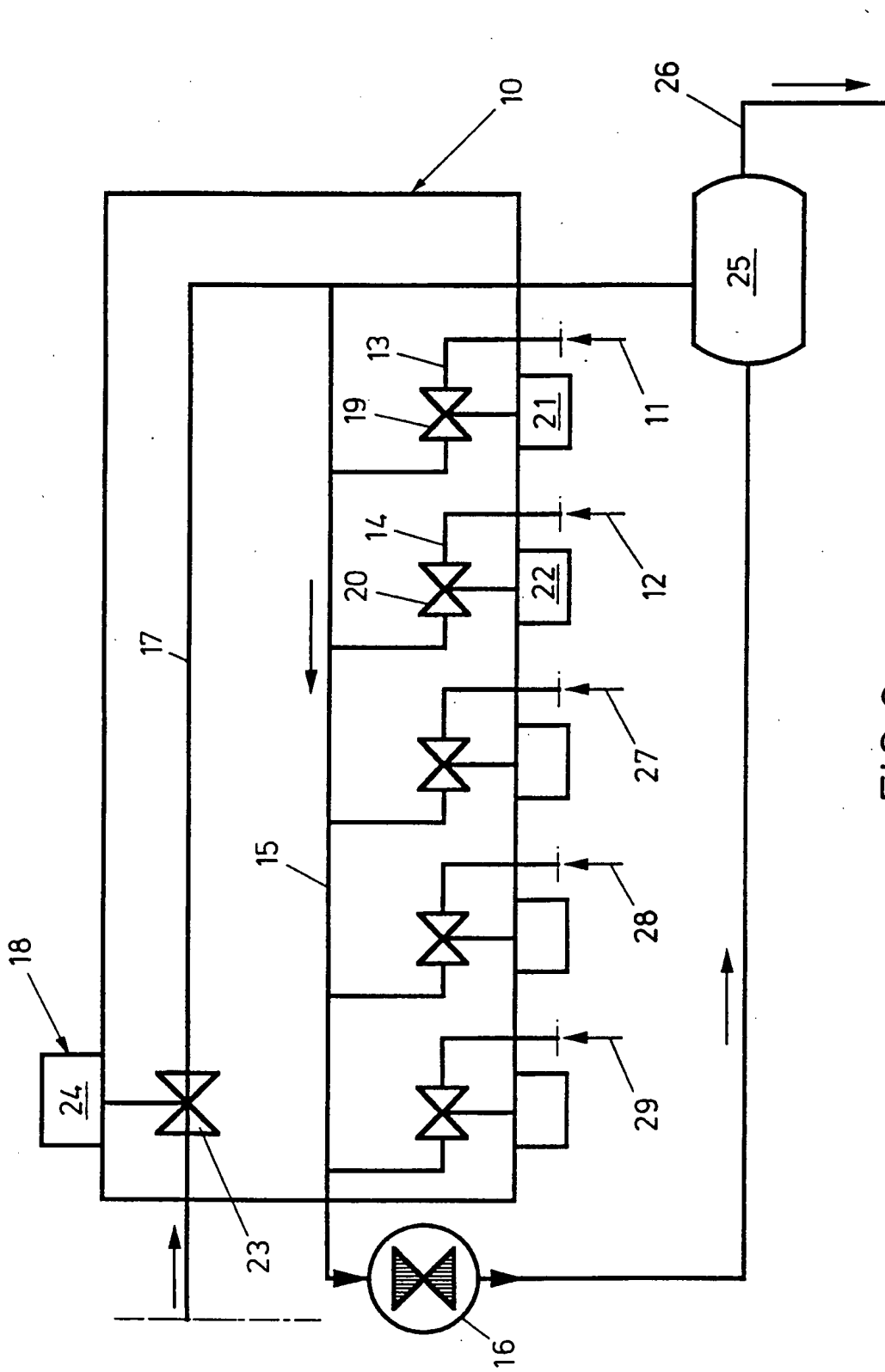
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FIG.1

FIG.2

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A,D	EP-A-0 396 117 (KEOMA SRL) * column 2, line 2 - line 14 * * column 3, line 38 - column 4, line 45 * * figure 1 * ---	1,3,7	A61H33/00 A61H33/02 A61L2/18 B08B9/00
A	EP-A-0 338 607 (IDEAL STANDARD S.R.L.) * column 1, line 49 - column 2, line 34 * * column 4, line 2 - column 5, line 2; figure 1 * ---	1,4,7	
A	EP-A-0 059 407 (SCHÜSSLER) * page 3, line 29 - line 34 * * page 11, line 26 - line 32 * * page 26, line 26 - line 35 * * figure 1 * ---	1	
A	FR-A-2 568 264 (RAYNAUD) * claims 1-5 * ---	1	
A	GB-A-1 229 582 (ALBRIGHT & WILSON) * page 1, line 56 - line 74 * * page 2, line 8 - line 57 * ---	1	TECHNICAL FIELDS SEARCHED (Int. Cl.5)
X	EP-A-0 215 514 (TEUCO GUZZINI) * column 2, line 51 - column 3, line 39 * * column 6, line 42 - column 8, line 4 * * figures 13,14 *	8,10,13, 14	A61H A61L B08B
A		11,15	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	21 SEPTEMBER 1992	SCHOENLEBEN J.

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